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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,535	07/25/2003	Tatsuro Uchida	03560.003334.	1160

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EXAMINER

SONG, SARAH U

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/626,535

Applicant(s)

UCHIDA, TATSURO

Examiner

Sarah Song

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AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration..
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0903.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The prior art documents submitted by the applicant in the Information Disclosure Statement filed on September 29, 2003 have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the semiconductor laser having a ring resonator must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement

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Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claim 8 is objected to because of the following informalities: in line 4, Examiner suggests changing “reconvert” to –reconverting–. Appropriate correction is required.
5. Claim 9 is objected to because of the following informalities: Examiner suggests inserting –is– before “sandwiched”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

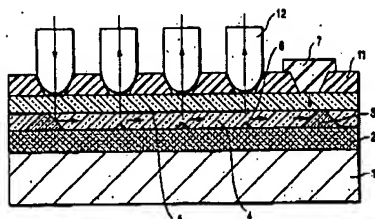
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1-5, 7 and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Furuyama (U.S. Patent 2004/0151462).**
8. Regarding claim 1, Furuyama discloses an optical waveguide apparatus comprising:
 - a waveguide capable of propagating light in two-dimensional directions;
 - a light transmitting unit 12 for transmitting light through said waveguide;
 - a light receiving unit 12 for receiving light transmitted through said waveguide; and

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- relaying means 6 for relaying light transmitted from said light transmitting unit and propagating in said waveguide at a place between said light transmitting unit and said light receiving unit to transmit the relayed light to said light receiving unit.



9. Regarding claim 2, said relaying means is constructed such that a propagation condition (e.g. direction) of light propagating in said waveguide can be changed at a place on a light propagation path between said light transmitting unit and said light receiving unit in a relaying manner.
10. Regarding claim 3, said relaying means includes a structure capable of diffusing a light toward directions of a predetermined angular range in said waveguide (see arrows).
11. Regarding claim 4, said structure of the relaying means has a thickness less than a thickness of a core layer of said waveguide (see Figure 12).
12. Regarding claim 5, said relaying means includes a reflective structure capable of changing a propagation direction of a light beam propagating in the form of a beam with maintaining the beam form (see Paragraph [0095]).
13. Regarding claim 7, said relaying means includes a structure capable of changing a propagation condition (e.g. direction) of light propagating in said waveguide without processing light in a regenerative manner by amplification and shaping.
14. Regarding claim 9, said waveguide has a structure in which a sheet-shaped core layer 4 is sandwiched by a first cladding layer 2 and a second cladding layer 5.

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15. Regarding claim 10, at least one of a light emitting device 12 in said light transmitting unit and a light receiving device 12 in said light receiving unit is arranged on a surface of said waveguide (see Figure 12).

16. Regarding claim 11, the optical waveguide apparatus further comprises an optical-path converting structure 3 for converting at least one light beam emitted from said light emitting device into at least one light beam propagating in at least one predetermined direction, said optical-path converting structure being arranged in a portion of said waveguide below said light emitting device.

17. Regarding claim 12, said optical-path converting structure 3 has a spherical, hemispherical, conical, wedge-shaped, or polygonal pyramid-shaped structure (see Figures 12 and 14).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. **Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama.**

20. Regarding claim 13, Furuyama does not expressly disclose a single VCSEL or an arrayed-type VCSEL.

21. VCSELs or arrayed-type VCSELs are well known in the art as compact light emitting devices.

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22. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a VCSEL as an optical source since applicant has not disclosed that the particular type of light emitting device solves any stated problem or is for any particular purpose.

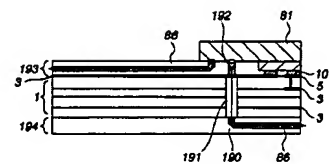
23. Furthermore, one of ordinary skill in the art would have been motivated to provide a VCSEL as the light emitting device in order to provide a compact planar structure thereby maintaining the planarity of the device of Furuyama.

24. **Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama as applied to claim 3 above, and further in view of Ouchi (U.S. Patent 6,477,286).**

25. Regarding claim 6, Furuyama does not expressly disclose a waveguide capable of transmitting light is vertically formed to said waveguide capable of transmitting light in two-dimensional directions.

26. Ouchi discloses an integrated circuit comprising a vertical waveguide 191 vertically formed to a horizontal waveguide.

27. Furuyama and Ouchi are analogous art as pertaining to integrated circuits.



28. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the vertically formed waveguide of Ouchi in the device of Furuyama.

29. One of ordinary skill in the art would have been motivated to provide the vertically formed waveguide in order to increase the freedom in wiring and to facilitate the fabrication of high density modules, as taught by Ouchi (see column 13, lines 45-48).

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30. **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama as applied to claim 1 above, and further in view of Kim (U.S. Patent 6,661,940).**

31. Regarding claim 8. Furuyama does not expressly disclose wherein said relaying means includes a light receiving device for receiving the propagating light to convert an optical signal of the propagating light into an electrical signal, and a light emitting device for reconvert the electrical signal obtained by the signal conversion into another optical signal such that a propagation condition of light propagating in said waveguide can be changed by processing the propagating light in a regenerative manner by amplification and shaping.

32. Kim discloses a relaying means includes a light receiving device for receiving the propagating light to convert an optical signal of the propagating light into an electrical signal, and a light emitting device for reconvert the electrical signal obtained by the signal conversion into another optical signal such that a propagation condition of light propagating in said waveguide can be changed by processing the propagating light in a regenerative manner by amplification and shaping (see paragraph spanning columns 7 and 8).

33. Furuyama and Kim are analogous art as pertaining to waveguiding plates.

34. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the relaying means disclosed by Kim, which includes a light receiving device for receiving the propagating light to convert an optical signal of the propagating light into an electrical signal, and a light emitting device for reconvert the electrical signal obtained by the signal conversion into another optical signal such that a propagation condition of light propagating in said waveguide can be changed by processing the propagating light in a regenerative manner by amplification and shaping, in the device of Furuyama.

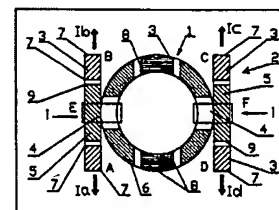
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35. One of ordinary skill in the art would have been motivated to provide the relaying means of Kim in order to amplify weak optical signals, and rebroadcast clean optical signals as taught by Kim.

36. **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama as applied to claim 10 above, and further in view of Lomashevitch (U.S. Patent 5,446,579).**

37. Regarding claim 14, Furuyama does not expressly disclose the light emitting device to be a semiconductor laser having a ring resonator.

38. Lomashevitch discloses a semiconductor laser having a ring resonator.



39. Furuyama and Lomashevitch are analogous art as pertaining to optical waveguide devices.

40. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the semiconductor laser having a ring resonator in the device of Furuyama.

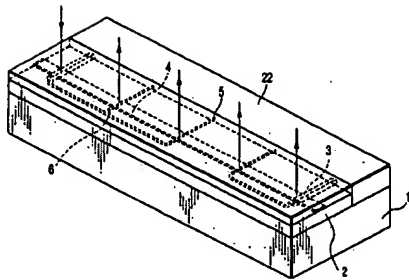
41. One of ordinary skill in the art would have been motivated to provide the light emitting device of Lomashevitch in the device of Furuyama in order to provide an increased number of ports thereby increasing functionality of the device (see paragraph spanning columns 1 and 2).

42. **Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama in view of Ouchi.**

43. Regarding claim 15, Furuyama discloses an opto-electronic hybrid circuit board for combining transmission of an optical signal and transmission of an electrical signal in a hybrid manner, said apparatus comprising:

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- an optical waveguide apparatus, said optical waveguide apparatus including a waveguide 2/4/5 capable of propagating light in two-dimensional directions, and relaying means 6 for relaying light transmitted from said light transmitting unit and propagating in said waveguide at a place between said light transmitting unit and said light receiving unit to transmit the relayed light to said light receiving unit; and
- an electronic circuit layer 22, said electronic circuit layer being electrically connected to said optical waveguide apparatus (see Paragraph [00153] and Figure 19).



44. Furuyama does not expressly disclose a light transmitting unit for transmitting light through said waveguide, a light receiving unit for receiving light transmitted through said waveguide in the embodiment shown in Figure 19.

45. Furuyama also does not expressly disclose wherein part or all of signals in said electronic circuit layer is distributed by transmission and reception of the optical signal using said optical waveguide apparatus to operate electronic equipment.

46. Ouchi discloses a light transmitting unit (e.g. 9), a light receiving unit (e.g. 8), and wherein part or all of signals in said electronic circuit layer is distributed by transmission and reception of the optical signal using said optical waveguide apparatus to operate electronic equipment (see Abstract).

47. Furuyama and Ouchi are analogous art as pertaining to integrated circuits.

48. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the light transmitting unit (e.g. 9), a light receiving unit (e.g.

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8), and the functionality of wherein part or all of signals in said electronic circuit layer is distributed by transmission and reception of the optical signal using said optical waveguide apparatus to operate electronic equipment of Ouchi in the device of Furuyama.


49. One of ordinary skill in the art would have been motivated to provide the above modifications in order to provide a compact multifunctional integrated structure having reduced cost as taught by Ouchi (see column 3, lines 8-12).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sarah Song
Patent Examiner
Group Art Unit 2874